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STUDENT-TEACHER INTERACTION AS A DETERMINER OF EFFECTIVE TEACHING.

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THIS STUDY TESTED THE HYPOTHESIS THAT THE EFFECTIVENESS OF A GIVEN TEACHER VARIES FROM ONE STUDENT TO ANOTHER AND THAT THIS DIFFERENCE IN EFFECTIVENESS IS A RESULT OF THE INTERACTION OF THE PERSONALITY PATTERNS OF THE STUDENT AND TEACHER. STUDENTS MAJORING IN MECHANICAL ENGINEERING, ANIMAL HUSBANDRY, AND HOME ECONOMICS WERE THE SUBJECTS. PERSONS FROM THE FIRST TWO AREAS WERE MALES AND ALL FROM THE LAST WERE FEMALES. EACH MEMBER OF THE SAMPLE WAS GIVEN A SURVEY AND A 100-ITEM BIOGRAPHICAL INVENTORY TO COMPLETE. THERE WAS SOME EVIDENCE OF THE EXISTENCE OF RELATIONSHIPS BETWEEN SELECTION RATIO AND PERSONALITY DIMENSIONS, BUT THE RESULTS WERE NOT CONSISTENT. IN THE MECHANICAL ENGINEERING SAMPLE, THE EMOTIONAL STABILITY SCALE DIFFERENTIATED ALONG THIS LINE AS EVIDENCED BOTH BY CORRELATIONS AND BY T-TESTS. NO SIGNIFICANT DIFFERENCES OTHER THAN CHANCE WERE FOUND FOR ANIMAL HUSBANDRY OR HOME ECONOMICS. THE USEFULNESS OF THE BIOGRAPHICAL INVENTORY IS QUESTIONABLE. IT WAS NOT HELPFUL IN THIS STUDY, SINCE IN THE INSTANCES IN WHICH SIGNIFICANT DIFFERENCES WERE FOUND THEY WERE NO MORE FREQUENT THAN WOULD HAVE BEEN EXPECTED BY CHANCE. IN ADDITION, THESE DIFFERENCES DID NOT MAKE SENSE, WHICH WAS FURTHER EVIDENCE THAT THEY WERE PROBABLY DUE TO CHANCE FACTORS. PERHAPS FURTHER WORK IS NEEDED IN REFINING AND ORGANIZING BIOGRAPHICAL INVENTORIES OF VARIOUS KINDS BEFORE THEY ARE APPLIED TO SUCH RESEARCH STUDIES AS THIS. (JL)

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STUDENT-TEACHER INTERACTION AS A DETERMINER OF EFFECTIVE TEACHING

Cooperative Research Project No. 763, SAE 8415

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Iowa State University

Ames, Iowa

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ABSTRACT

This study was designed to test the hypothesis that the effectiveness of a given teacher varies from one student to another and that this difference in effectiveness is a result of the interaction of the personality patterns of the student and teacher.

Procedure

College students majoring in Mechanical Engineering, Animal Husbandry, and Home Economics, and the instructors in these areas, were the subjects. All persons from the first two areas were males and all from the last were females. Included from Mechanical Engineering were 70 students and 13 instructors, from Animal Husbandry were 56 students and 12 instructors, and from Home Economics were 43 students and 10 instructors.

Each member of the sample, both students and instructors, was asked to complete the Guilford-Zimmerman Temperament Survey and a 100-item biographical inventory. In addition, each student was given a list of instructors in his area and asked to indicate (1) the amount of class contact he had had with each, (2) the person on the list who had provided the most effective learning experience for him, and (3) his reasons for selecting this person as most effective. For each instructor, a selection ratio---frequency of choice vs. frequency of contact with the students---was computed.

The Guilford-Zimmerman data was analyzed by first grouping the students according to the instructors whom they selected as most

effective. An F-test was made on each scale to determine if there were significant differences among these groups of students on any of the scales. On those scales for which such differences were found, a t-test was made between the scores of students who chose and those who didn't choose each instructor to locate those instructors whose students were contributing most to this variation. Relationships between the instructors' selection ratios and scores on each of the scales were also checked.

The biographical data was analyzed by treating each item separately. On each item, the instructors who gave the same response were combined, and the distribution of responses to that item of the students who chose them was compared with the distribution of the students who didn't choose them in a search for significant differences. In addition, the instructors were separated into a high and a low group on the basis of their selection ratios and a comparison was made on each item of the response distribution of these two groups. In each case, Fisher's exact test of significance was used.

A qualitative analysis was also made of the descriptive statements which the students made of the instructors whom they selected.

Results

Mechanical Engineering. Two of the instructors had high selection ratios (.63 and .39). The remaining ratios varied from .13 to .00. A test of the hypothesis that the Guilford-Zimmerman scores of the students who chose a particular instructor were not different from those of the students who chose other instructors found only one F-ratio of the ten to be significant at the five per cent level. This

ratio was 2.39 for the Restraint scale. No significant differences were found for any of the instructors on this scale by use of the t-test between the means of students who chose and those who didn't choose an instructor.

Correlation between selection ratios and scores on each scale produced two significant correlations: -.63 for the Emotional Stability scale (significant at the one per cent level), and -.46 for the Sociability scale (significant at the five per cent level). Comparison of the mean scores on each scale of the six highest and seven lowest instructors produced significant t-values for the Emotional Stability scale (3.87) and the Friendliness scale (2.38), both significant at the five per cent level.

Comparison of the variances of students and instructors on each of the scales showed the students to be significantly less homogeneous on the Restraint scale ($F = 1.91$) and more homogeneous on the Friendliness scale ($F = 2.02$).

Comparison of the instructors with high and low selection ratios as to their distributions on the biographical items showed only six significant differences at the five per cent level out of 100 items, which could be attributed to chance factors.

Comparison of the response distributions on each item of the students who selected the two instructors with the highest selection ratios showed no significant differences at the five per cent level. Comparison of the responses of each of these two student groups with the responses of the other students on each item showed no significant differences for the one instructor's group and three for the other, a result attributable to chance factors.

Inspection of the descriptive statements written about the instructors showed that the students who chose different instructors differed little in the kinds of behaviors which they emphasized. Statements pertaining to "teaching methods" were most common, those pertaining to "treatment of students" were next, and those pertaining to "personal characteristics" were least frequent.

Animal Husbandry. The selection ratios varied from .61 to .00. A test of the hypothesis that the Guilford-Zimmerman scores of the students who chose a particular instructor were not different from those of the students who chose other instructors found only one F-ratio to be significant. This ratio was 3.18 for the Masculinity scale, significant at the one per cent level. A series of t-tests in which the mean scores on the Masculinity scale of the students who chose an instructor were compared with the mean scores of the students who didn't choose him produced two significant differences: 2.62, significant at the two per cent level, and 1.86, significant at the ten per cent level.

Correlation between selection ratios and scale scores on each scale produced one significant correlation: -.51 on the Masculinity scale. Comparison of the mean scores on each scale of the six highest and six lowest instructors produced a t-value significant at the five per cent level for only the General Activity scale (2.62).

Comparison of the variances of students and instructors on each of the scales showed the students to be significantly less homogeneous on the Restraint scale (F = 2.52) and the Sociability scale (F = 2.85) and to be significantly more homogeneous on the Masculinity scale (F = 2.39).

Comparison of the instructors with high and low selection ratios as to their distributions on the biographical items showed only one significant difference at the five per cent level, a result attributable to chance factors.

Combining the instructors who gave the same response to an item, and comparing the response distribution of the students who chose them with the responses of the remainder of the students, also produced only one significant difference at the five per cent level.

Statements pertaining to "teaching methods" were mentioned most frequently by the Animal Husbandry students, but statements pertaining to "personal characteristics" were mentioned more frequently by this group than by the Mechanical Engineers.

Home Economics. The selection ratios of the instructors varied from .60 to .00. A test of the hypothesis that the Guilford-Zimmerman scores of the students who chose a particular instructor were not different from those of the students who chose other instructors found only one significant difference at the five per cent level: 2.89 for the General Activity scale. A series of t-tests in which the mean scores on the General Activity scale of the students who chose an instructor were compared with the mean scores of the students who didn't choose her produced two significant differences: 3.10, significant at the two per cent level, and 2.53, significant at the ten per cent level.

Correlation between selection ratios and scores on each scale produced one significant correlation: -.74 on the Objectivity scale.

Comparison of the mean scores on each scale of the five highest and five lowest instructors produced no t-values significant at the five per cent level.

Comparison of the variances of students and instructors on each of the scales showed the students to be significantly less homogeneous on the Objectivity scale (F = 3.54) and the Thoughtfulness scale (F = 3.38).

Comparison of the instructors with high and low selection ratios as to their distributions on the biographical items showed only four significant differences at the five per cent level, a result attributable to chance factors.

Combining the instructors who gave the same response to an item, and comparing the response distribution of the students who chose them with the responses of the remainder of the students, produced only two significant differences at the five per cent level, also attributable to chance.

Statements pertaining to "teaching methods" were mentioned most frequently, but statements pertaining to "treatment of students" were mentioned more frequently than by the other two groups.

Combined groups. The Guilford-Zimmerman scores of the two instructors from Mechanical Engineering and Animal Husbandry with the highest selection ratios were compared. No significant F-ratios were found for the variance between departments, the variance among the scales, or the mean square interaction.

The high-ratio instructors from Mechanical Engineering and Animal Husbandry were combined and were compared with the low-ratio instructors

from these departments as to their responses to the biographical items. In only four cases were significant differences between the distributions found, a result attributable to chance.

Conclusions

The results of this study may be summerized as follows:

1. The instance in which a Guilford-Zimmerman scale most significantly differentiated among students grouped according to instructor choice was the Masculinity scale applied to the Animal Husbandry sample. The F-test for this scale was significant at the one per cent level, and the t-tests were significant for two instructors. For the Mechanical Engineering sample, the Restraint scale was significant at the five per cent level, but none of the t-tests on this scale were significant. For the Home Economics sample, the General Activity scale was significant at the five per cent level and two of the t-tests were significant. This suggests that students do tend to interact with instructors along certain personality dimensions for effective learning, but that such dimensions are difficult to locate and are probably specific to the particular group involved.

2. There was some evidence of the existence of relationships between selection ratio (the criterion of effectiveness) and personality dimensions, but the results were not consistent. For the Mechanical Engineering sample, the Emotional Stability scale differentiated along this line as evidenced both by correlations and by t-tests. The Sociability scale was significant only as evidenced by correlation and the Friendliness scale was significant only as evidenced by the t-test. On all three scales, the more effective instructors scored lower than the

less effective. No significant differences other than those to be expected by chance were found for Animal Husbandry or Home Economics.

3. Significant differences between the variances of the students and instructors were found on two Guilford-Zimmerman scales for Mechanical Engineering, three scales for Animal Husbandry, and two scales for Home Economics. In only two of these seven cases were the students found to be more homogeneous than the instructors. One of these was found in Mechanical Engineering and the other in Animal Husbandry.

4. There was generally no strong tendency for the instructors and the students who selected them to have similar scores on the Guilford-Zimmerman scales. The exception was in Mechanical Engineering, in which the two instructors selected with outstanding frequency also had more scales in common with their students than did the other instructors.

5. The biographical data gave uniformly negative results. In all cases, the number of items found to differentiate significantly between the groups under consideration were no more than would be expected by chance. There was some slight indication, particularly in the Mechanical Engineering and Home Economics samples, that the more effective instructors tended to have a more intellectual background and interests, but this must be highly qualified. There was no evidence of student-teacher interaction on any of these items which could be attributed to a true interaction.

6. In describing their reasons for their selection of a teacher as most effective, the students mentioned characteristics involving teaching methods most frequently, treatment of students second, and personal characteristics last. The Home Economics students tended to put relatively more emphasis on "treatment of students" than did the male groups.

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INTRODUCTION

A major issue in education today is the question of what constitutes good teaching and what are the characteristics of good teachers. The results of numerous studies indicate that the problem is highly complex, necessitating a subdivision into specific issues which are more amenable to experimental research.

The present study is an investigation of several measures of teacher characteristics which may (1) differentiate good from poor teachers or (2) determine if the effectiveness of a particular teacher is, rather, a function of the characteristics of the students he teaches. Educators commonly assume that the latter situation exists to some degree, one teacher not being equally effective for all students, and that such differences in effectiveness are a product of the interaction of the personalities of the teachers and students involved. The rational basis for this belief has seldom been questioned, but there is little experimental evidence in the literature to justify it. It seems important to have some experimental verification of this assumption and to know more about the way in which various personality characteristics influence teaching effectiveness. This is the general basis for the present study.

Specifically, this study was designed to provide answers for the following questions: (1) Are there certain personality characteristics which consistently differentiate between more and less effective teachers? (2) To what extent does student-teacher interaction contribute

to effective teaching? (3) Does similarity of personality between student and teacher have any influence on the effectiveness of that teacher for that particular student? (4) Which personality characteristics are most influential in determining the effectiveness of student-teacher interaction? (5) Are the personality characteristics which influence student-teacher interaction related to the subject matter being taught or the sex of the individual involved?

Research pertaining to the general problem of teaching effectiveness has been quite extensive. For example, a survey of the literature relating to this area published in 1950 by Domas and Tiedeman includes more than one thousand studies. Once every three years the Review of Educational Research devotes a section to a survey of recent studies pertaining to the measurement and prediction of teacher efficiency, which is always extensive. The most recent study survey (Barr and Jones, 1958) included 58 references. The amount of research in this area is therefore great, but examination of the relevant literature has failed to disclose any study which has approached this problem from the standpoint of student-teacher interaction along specific personality dimensions.

The majority of investigations pertaining to teacher effectiveness have been concerned with one of two problems: (1) isolation of the characteristics of the good teacher; or (2) evaluation of various criteria of teacher effectiveness, especially those of ratings and pupil change. Some of the characteristics investigated have been personality characteristics, but only a few investigators have suggested the possibility that good teachers cannot be accurately

described as a group by specific personality traits. Among those who have recognised this possibility are Archer (1946), Lamke (1959), Remmers (1952), and Ryans (1960).

Student-teacher interaction has been the subject of a relatively small amount of research, most of which has been concerned with the amount of interaction rather than the dimensions along which it occurs. The major exception to this has been the series of studies conducted under the supervision of Robert Bush of Stanford University (1954). Among other things, he found that pupil achievement was unrelated to teacher-pupil similarity of interests and social beliefs, although these factors did influence the liking of pupils for particular teachers.

There have been in recent years a number of complex and extensive research programs which have approached the problem of teacher effectiveness from various points of view. These have been summarized by Fulkerson (1954). In general, these studies seem to have concentrated on an intensive analysis of classroom behavior of teachers and on the determination of characteristics of good teachers, rather than on student-teacher interaction. The most extensive of these is probably the ten-year study of teacher characteristics recently completed and reported by Ryans (1960).

PROCEDURE

In the present study, each member of a group of college students was asked to select from among the teachers in his major area the one whom he judged to have been most effective for him. A personality inventory and a biographical inventory were administered to both the students and teachers, and an analysis was made of their responses to determine if the students who selected a particular teacher were significantly different on any of the variables from those who selected other teachers and how this difference compared with the responses of the teachers. If student-teacher personality interaction were operating to influence the students' perceptions of teachers as more or less effective, it was hoped that such influences would be located in this way.

Sample. The teachers and students were drawn from three areas at Iowa State University: the Department of Mechanical Engineering, the Department of Animal Husbandry, and the College of Home Economics. The first two groups were chosen because all of the teachers and students were male. These two samples provided a control for the possible influence of sex differences within the sample, while the wide difference in subject matter between them served as a test of the influence of subject matter. The Home Economics College was chosen in order to make comparisons along the line of possible sex differences in degrees and kinds of personality interactions.

The original sample of students included (1) all male seniors majoring in the Department of Mechanical Engineering, (2) all male juniors and seniors majoring in the Department of Animal Husbandry, and (3) a representative sample of female seniors majoring in Home Economics. Each student in the sample was sent a letter requesting his cooperation in a study of teaching effectiveness. (See Appendix A.) The Mechanical Engineering and Animal Husbandry students were paid $1.50 for their time. The Home Economics students were not paid since this was contrary to the established policy of the Home Economics College toward student participation in academic research. A follow-up letter was sent approximately one month later to those students who had not yet participated in the project. The number of students contacted in each department and the number who participated are given in Table 1.

Table 1

Number of students contacted and participating in the project

	Contacted	Participating
Mechanical Engineering	121	80
Animal Husbandry	90	56
Home Economics	189	43

All faculty members in Mechanical Engineering and Animal Husbandry were asked to participate, as were all instructors in Home Economics who taught the basic courses in their "core curriculum" which all Home Economics students must take during their program. The number of faculty members in each area who were contacted and the number who returned the questionnaires are given in Table 2.

Table 2

Number of faculty members contacted and participating in the project

	Contacted	Participating
Mechanical Engineering	19	13
Animal Husbandry	14	12
Home Economics	12	10

Each student was asked to complete two questionnaires: (1) the Guilford-Zimmerman Temperament Survey, and (2) a biographical inventory devised by the investigator. (A copy of the directions, and a sample page of this inventory, are printed in Appendix B.) In addition, each student was given a list of instructors in his department and asked to indicate (1) the number of courses which he had taken with each instructor, (2) the number of credit hours he had taken with each, and (3) the number of contact hours per week he had taken with each. He was then given the following written instructions:

> Now look back over this list of teachers and draw a line under the name of the person who provided the best learning experience for you. We want to know which one of these teachers was best for you personally. Try to consider each teacher apart from the subject matter taught by him/her or your out-of-class contact with him/her. Please choose one and no more.

After making this selection, the student was asked to write a brief statement giving his reasons for selecting that particular teacher as most effective.

Meetings were held with the participating teachers in which the project was explained to them. They were asked to fill out the same

two questionnaires as were being administered to the students: the Guilford-Zimmerman and the biographical inventory. These were returned by mail to the investigator.

Analysis. The techniques for analysis of the data were chosen so as to locate possible group differences between those students who chose a particular instructor as best and those who had had course contact with him but didn't choose him. Since the Guilford-Zimmerman can be scored according to scales whereas the biographical inventory is composed of 100 unorganized items, responses to the two instruments had to be analyzed somewhat differently.

The first step in the analysis of the Guilford-Zimmerman was the computation of the mean and standard deviation for each scale for the entire group of students and for the entire group of instructors within one department. The students were then grouped according to their choices of instructors, and an F-test was made on each scale to determine if there were significant differences among the groups of students on any of the scales. On those scales on which such differences were found, a t-test was made between the scores of students who chose and those who didn't choose each instructor to locate those instructors whose students were contributing most heavily to this variation.

Another approach was the location of those instructors who were selected most frequently as being effective and the comparison of their responses on each of the scales with the responses of the other instructors to determine whether there were any differences between the two groups. A t-test was used to compare the means of the two groups on each scale.

Analysis of the biographical inventory presented greater problems. It was finally decided to deal with each item individually rather than attempting to group them on an arbitrary basis. The instructors were therefore separated into two groups on the basis of frequency of choice in relationship to frequency of contact. The responses of these two groups were compared on each item for which the variation in response was great enough to permit the possibility of differences. On these items, the significance of the difference of distributions between the two groups was tested by Fisher's exact method for very small samples (Walker and Lev, 1953, p. 103).

Individual comparisons were made for each item of the biographical inventory for which there was sufficient variation in response, by treating the instructors who gave the same response to a single item as one person. On this basis, the responses of the students who had selected those instructors were compared with the responses of the students who had not selected those instructors to determine whether the response distributions of the two groups of students on that item differed significantly. The test of significance was Fisher's exact method.

In addition to the statistical analyses described above, a qualitative analysis was made of the descriptive responses given by the students in explaining their choice of instructor. Although this was outside the major area of study, advantage was taken of the opportunity to collect data of this type.

RESULTS

Mechanical Engineering

The total number of Mechanical Engineering students responding was 70 and of instructors was thirteen. A "selection ratio" was computed for each instructor as an index of the frequency of his class contact with the students who chose him as most effective as compared with his frequency of class contact with all students in the sample. This seemed to be a fairer estimate of effectiveness than simply his frequency of choice by the students. Inspection of the data, however, indicated that the method used actually made little difference in the rank order of effectiveness in this sample. It was found that two of the instructors were outstandingly effective, both the number of choices and the selection ratios for these two being considerably higher than for any others. One of these instructors was chosen 30 times and the other 18 times; their selection ratios were .63 and .39 respectively. The number of choices for the other eleven instructors varied from seven to zero and their selection ratios varied from .13 to .00.

Guilford-Zimmerman data. The mean raw score and standard deviation for each scale on the Guilford-Zimmerman Temperament Survey are presented for both students and instructors in Table 3.

Table 3

Means and standard deviations for scales of the Guilford-Zimmerman Temperament Survey, Mechanical Engineering sample

G-Z scale	Student mean	Instructor mean	Student s.d.	Instructor s.d.
G	15.28	15.92	4.92	4.02
R	18.58	19.85	5.17	3.74
A	15.61	15.92	5.86	5.80
S	18.98	17.31	6.47	6.32
E	19.70	20.46	4.74	4.38
O	20.07	22.15	5.37	4.06
F	15.38	18.15	4.84	6.87
T	18.23	18.54	5.22	6.34
P	20.30	22.38	5.02	4.14
M	21.74	22.08	4.69	3.59

Table 4 reports the results of tests of the null hypothesis that the scores on each of the Guilford-Zimmerman scales of the students who chose a particular instructor are not different from those of the students who chose other instructors. The probability level was obtained through referring the variance ratios to the F-table.

Table 4

F-ratios of student groups on each Guilford-Zimmerman scale, Mechanical Engineering sample

G	R	A	S	E	O	F	T	P	M
1.16	2.39*	1.18	1.56	0.62	0.28	0.11	0.15	0.96	0.77

*Significant at the five per cent level

The Restraint scale was significant at the five per cent level, meaning that there was a tendency for the students who chose different instructors to differ on this scale. On none of the other

scales was significance even approached. However, finding one scale in ten producing significant results at the five per cent level is actually little better than chance, which casts doubt on the confidence which can be placed in the results.

Since two instructors were selected by a large majority of the students, only these two were used to analyze differences on the Restraint scale. For each instructor, the scores on the Restraint scale of the students who chose him were compared with the scores of those students who had had contact with him but didn't choose him. A t-test was then made between the means of these two groups on this scale. The degrees of freedom for the two t-tests were 53 and 57, and the t-values were 0.00 and 0.394 respectively. This means that the two student groups appear to be highly similar on the Restraint scale for each of these instructors.

In order to determine if there was any relationship between frequency of choice and the instructors' scores on the various scales, a product-moment correlation was computed between the instructors' selection ratios and their raw scores on each scale. The results are presented in Table 5.

Table 5

Product-moment correlations between instructors' selection ratios and their scores on Guilford-Zimmerman scales, Mechanical Engineering sample

G	R	A	S	E	O	F	T	P	M
-.02	.00	-.04	-.46*	-.63**	-.30	-.30	.16	-.16	-.38

* Significant at the five per cent level
** Significant at the one per cent level

This suggests that there was a definite tendency for the more effective instructors to score lower on the Emotional Stability scale and, less definitely, on the Sociability scale.

Another approach to this same problem was to compare the scores on each scale of the most frequently chosen instructors with those of the less frequently chosen ones. For this purpose, six of the Mechanical Engineering instructors were included in the upper group and seven in the lower group. A t-test was made of the difference between the means of these two groups on each scale. The results are reported in Table 6.

Table 6

Comparison of the mean scores of most and least frequently chosen instructors on Guilford-Zimmerman scales, Mechanical Engineering sample

G-Z scale	Upper group mean	Lower group mean	t
G	18.17	14.00	2.11
R	20.00	19.71	0.13
A	17.17	14.86	0.70
S	14.67	19.67	1.46
E	17.00	23.43	3.37*
O	20.50	22.14	0.72
F	14.00	21.71	2.38*
T	22.00	15.57	2.05
P	20.83	23.71	1.28
M	20.33	23.57	1.75

* Significant at the five per cent level

These results indicate that the upper group tended to score significantly lower on Emotional Stability and Friendliness than did the lower group. The significant difference in scores on the E scale substantiates that found by the correlation procedure.

A comparison of the variances of the students and instructors was made to see if the two groups differed significantly in this respect on any of the scales. In each case a two-tailed test of significance was used. The results are given in Table 7.

Table 7

F-ratios of variance of Mechanical Engineering students and instructors on Guilford-Zimmerman scales

G	R	A	S	E	O	F	T	P	M
1.50	1.91*	1.02	1.05	1.17	1.75	2.02*	1.48	1.47	1.71

* Significant at the 10 per cent level

Two of the scales, Restraint and Friendliness, show significant differences at the ten per cent level. Comparison with Table 3 shows that the students' variance was greater than that of the instructors on the Restraint scale and less than that of the instructors on the Friendliness scale.

As a final step, an instructor's score on a scale was compared with the mean score on that scale of the students who chose him to determine on which scales the two scores were highly similar. If the mean score for the students was within two points of the instructor's score on a particular scale, the scores were said to be highly similar for that scale. The two instructors who were chosen most frequently as effective also had the most scales in common with the students who selected them. The most effective instructor had six scales on which his scores were highly similar to those of the

students who chose him (G, R, A, O, F, and M) and the second most effective instructor had four scales on which his scores were highly similar to those of his students (G, A, O, and T). The remainder of the instructors had two or three scales in common with those students who chose them. There was no tendency for any of the scales to show instructor-student similarity more frequently than others.

Biographical information. The Mechanical Engineering instructors were divided into two groups based on their selection ratios: the six who were selected most frequently and the seven who were selected least frequently were grouped together. The purpose was to determine if these two groups differed significantly in their responses to any of the biographical items. The procedure was to combine the responses to an item into two categories so as to produce a two-by-two table. Since the sample size was quite small, Fisher's exact method was used to determine if the distribution of the responses of the high group differed significantly from that of the low group.

On six of the 100 biographical items, significant differences at the five per cent level between the high and low groups were found. Since five significant items would be found by chance, this result is probably not of real significance. Inspection of the responses to these items shows that the high group tended to (a) have been born in larger towns, (b) come from families with less favorable attitudes toward teachers, (c) have found high school work easier, (d) do more outside reading, (e) find religion to be less personally important, (f) enjoy public speaking less.

The remainder of this analysis dealt with the responses of the two instructors with outstandingly high selection ratios and those of the students who selected them.

The biographical responses of the students who selected the most effective teacher were compared with those of the students who selected the second most effective teacher to determine if they differed significantly on any of the items. No significant differences were found at the five per cent level.

The distributions on the biographical items of the students who chose each of these two instructors were compared separately with those of the remaining students. For instructor number two, no significant differences were found. For instructor number one (the most effective), three significant differences were found at the five per cent level. The students who chose this instructor had fathers who were better educated than the rest, had a stronger interest in school as a child, and came from families who had less association with academic people than did the others. However, it is not suprising to find three items significant out of 100, so again these results are probably due to chance factors.

Descriptive material. In conjunction with his choice of most effective instructor, each student had been asked to write a brief summary of his reasons for choosing this particular individual. An attempt was made to analyze these statements by tabulating the number of times a certain characteristic was mentioned for each instructor. These characteristics were then grouped into three areas:

(1) statements pertaining to treatment of students in class (e.g., use of class time, making expectations known, giving extra help); (2) statements pertaining to teaching methods (e.g., preparation, clearness of presentation, outlined lectures); (3) statements pertaining to personal characteristics (e.g., dress, speaking voice, friendliness).

The percentages of the total number of statements made about an instructor which fell into each of these three areas were computed and comparison was made among the instructors to determine if the students who chose different instructors tended to differ in the kinds of characteristics they thought important. Little difference of this nature was found. For most instructors, statements concerning "teaching methods" comprised between two-thirds and four-fifths of the statements made. Statements concerning "treatment of students" were next most common, while statements concerning "personal characteristics" were relatively infrequent. There was no evidence that the students who chose different instructors were focusing on different behaviors. Generally, the same kinds of statements tended to be made about all instructors.

Animal Husbandry

The total number of Animal Husbandry students responding was 56 and of instructors was twelve. Selection ratios were computed in the same manner as for the Mechanical Engineering instructors. Three of the teachers had high ratios (.61, .40, and .35), three more had substantial ratios (.29, .23, and .22), and the remainder were between .09 and zero. The number of times which any one instructor was chosen ranged from fourteen to zero.

Guilford-Zimmerman data. The mean raw score and standard deviation for each scale on the Guilford-Zimmerman Temperament Survey are presented for both the students and the instructors in Table 8.

Table 8

Means and standard deviations for Guilford-Zimmerman scales, Animal Husbandry sample

G-Z scale	Student mean	Instructor mean	Student s.d.	Instructor s.d.
G	15.25	17.17	5.53	6.12
R	16.84	20.92	4.62	2.91
A	16.48	16.58	5.55	4.76
S	19.98	18.17	6.33	3.75
E	18.20	22.84	5.84	3.80
O	18.68	20.84	5.06	4.50
F	14.88	17.83	5.16	5.32
T	17.38	20.00	5.01	3.98
P	19.22	22.25	4.79	5.49
M	19.93	19.50	3.32	5.13

Table 9 reports the results of tests of the null hypothesis that the scores of the students who chose a particular instructor are not different from those of the students who chose other instructors on each of the Guilford-Zimmerman scales. The variance ratios were referred to the F-table.

Table 9

F-ratios of student groups on each Guilford-Zimmerman scale, Animal Husbandry sample

G	R	A	S	E	O	F	T	P	M
0.42	0.72	0.46	0.42	1.88	1.91	2.12	0.75	2.07	3.18**

** Significant at the one per cent level

Therefore, only in the case of the Masculinity scale might the null hypothesis be rejected. This means that there is a tendency for the students who chose different instructors to differ significantly on this scale. Although only one scale of the ten is significant, this results probably has some validity since this difference is at the one per cent level and would therefore not be due solely to chance factors.

The significance of the Masculinity scale was tested for each of the seven most frequently chosen instructors. In each case, the mean score on this scale of the students who chose the instructor was compared with the mean score for those students having had contact with him but not choosing him. The significance of the difference between these means was tested by Ahent-test. A two-tailed test was used. Only two of the t-values approached significance: 1.86, significant at the 10 per cent level, and 2.62, significant at the two per cent level. This means that for these two instructors, and particularly for the latter, the students choosing them differed significantly from those having had contact with them but not choosing them on the basis of their scores on the Masculinity scale. In the case of the t with greater significance, the students who chose this particular instructor scored higher as a group on the Masculinity scale than did the other students. This instructor also scored somewhat higher than most of the other instructors on this characteristic. The conclusion may be drawn that this group of students tended to evaluate themselves as more masculine than most

and to prefer a rather masculine type of instructor. In the case of the other instructor, his score on the M scale, while only average, was identical with the mean score of the students who selected him.

Product-moment correlations between instructors' selection ratios and their scores on each of the scales were computed to determine if the more frequently selected instructors differed significantly from these less frequently selected on these traits. The results are presented in Table 10.

Table 10

Product-moment correlation between instructors' selection ratios and their scores on the Guilford-Zimmerman scales, Animal Husbandry sample

G	R	A	S	E	O	F	T	P	M
.40	-.27	.15	-.04	-.21	-.44	-.25	.35	-.17	-.51*

* Significant at the five per cent level

This suggests that there was a tendency for the more effective instructors to score lower on the Masculinity scale than did the other instructors, but this difference may have been due to chance factors.

A comparison was also made of the six most frequently chosen instructors and the six least frequently chosen ones to determine if these two groups differed significantly on any of the Guilford-Zimmerman scales. A t-test of significance was used. The results are reported in Table 11.

Table 11

Comperison of most and least frequently chosen Animal Husbandry instructors on Guilford-Zimmerman scales

G-Z scale	Upper group mean	Lower group mean	t
G	19.30	15.00	2.62*
R	20.80	21.00	0.11
A	17.70	15.50	0.76
S	17.83	18.50	0.30
E	22.00	23.67	0.75
O	19.67	22.00	0.89
F	17.67	18.00	0.10
T	21.33	18.67	1.19
P	22.17	22.33	0.05
M	17.83	21.17	1.21

*Significant at the fiverper cent level

This suggests that there was a tendency for the more effective instructors to score higher in General Activity than did the others. However, one scale out of ten being significant at the five per cent level could be due to chance factors, so the validity of this conclusion is questionable.

In Table 12 are compared the variances of the instructors and the students on each of the scales.

Table 12

F-ratios of variance of Animal Husbandry students and instructors on Guilford-Zimmerman scales

G	R	A	S	E	O	F	T	P	M
1.23	2.52*	1.36	2.85*	2.36	1.26	1.06	1.59	1.31	2.39*

* Significant at the 10 per cent level

This means that there was a slight tendency for the instructors to be more homogeneous than the students on the Restraint and Sociability scales, and for the students to be more homogeneous on the Masculinity scale.

A comparison was also made of the number of scales on which an instructor and his students were similar, by the same process as described for Mechanical Engineering. The results for Animal Husbandry are less clear cut. Of the three instructors with the highest selection ratios, one had six scales in common with the students who selected him (A, E, O, T, P, and M); one had two scales in common with his students (G and S); and the other had only one scale in common with his students (S). For the remainder of the instructors, the number of scales in common with the students who selected them varied from one to four. As in the case of Mechanical Engineering, there was no tendency for certain scales to be found similar more frequently.

Biographical information. The Animal Husbandry instructors were divided into two groups based on their selection ratios: the six with the highest ratios, and the six with the lowest. Comparisons were made to determine if the distributions of these two groups differed on any of the biographical items. Fisher's exact method was used.

On only one of the 200 items was a significant difference discovered at the five per cent level. According to this item, the more effective instructors had fewer siblings than did the less effective instructors. However, one significant item is less than would be expected by chance from a 160-item questionnaire, so this result is probably invalid.

Since there were more instructors with reasonably high selection ratios, the job of determining clusters of biographical items around instructors was made more complicated than for Mechanical Engineering. The procedure in this case was to combine the instructors who gave the same response to an item and compare responses of the students who chose these instructors with the responses of the other students. The distributions of the two groups of students were compared by Fisher's exact method. In only one case was a significant difference found: the students who chose two of the instructors were more dissatisfied with their college grades than were the other students. But these two instructors indicated that they themselves had been satisfied with their own grades while in college. This result is undoubtedly invalid since, in addition to chance factors probably accounting for the significance of one item, the result itself defies explanation.

Descriptive material. Analysis of the descriptive statements made of the most effective instructor choices gave results very similar to those for Mechanical Engineering: "teaching method" was the most frequently cited category, followed by "treatment of students" and "personal characteristics." The only difference was the somewhat greater emphasis put on "personal characteristics" by the Animal Husbandry students; for some of the instructors this was mentioned more frequently than was "treatment of students."

Home Economics

The total number of Home Economics students responding was 43 and of instructors was ten. Selection ratios were computed in the same manner as for the other groups. These ratios varied from .60 to .00. The number of times which any one instructor was chosen varied from twelve to zero.

The Home Economics College included a number of different departments, most of which were represented in the instructor sample. It was therefore possible that the students' selections of the most effective teacher might be biased by the subject matter which the various instructors taught. This had not been a problem for the male group since each had come from a single department. However, only eleven of the 43 students selected teachers from the department in which they were majoring, so the factor of departmental bias does not seem to have been operating to any great extent.

Guilford-Zimmerman data. The mean raw score and standard deviation for each scale of the Guilford-Zimmerman Temperament Survey are presented in Table 13.

Table 14 reports the results of tests of the null hypothesis that the scores of the students who chose a particular instructor are not different from those of the students who chose other instructors on each of the Guilford-Zimmerman scales. The variance ratios were referred to the F-table.

Table 13

Means and standard deviations for Guilford-Zimmerman scales, Home Economics sample

G-Z scale	Student mean	Instructor mean	Student s.d.	Instructor s.d.
G	16.05	16.50	5.75	5.71
R	18.47	21.80	4.73	4.55
A	15.07	12.00	5.46	3.37
S	19.01	17.00	5.93	6.09
E	19.93	22.80	5.56	3.68
O	17.88	20.30	5.25	2.79
F	17.63	19.10	4.50	4.20
T	19.58	20.00	4.82	2.62
P	19.16	22.00	5.27	4.42
M	12.00	12.10	4.28	4.20

Table 14

F-ratios of student groups on each Guilford-Zimmerman scale

G	R	A	S	E	O	F	T	P	M
2.89*	0.73	1.51	0.79	1.48	1.42	1.11	1.09	0.90	1.16

* Significant at the five per cent level

Therefore, only in the case of the General Activity scale might the null hypothesis be rejected. Since only one scale is significant, and that at the five per cent level only, this result is probably due to chance factors.

The significance of the General Activity scale was tested for the eight most frequently chosen instructors. In each case, the mean score on this scale of the students who chose the instructor was compared with the mean score for those having had contact with her but not choosing her. The significance of the difference between these means was

tested by a two-tailed t-test. Only two of the t-values approached significance: 2.53, significant at the ten per cent level, and 3.10, significant at the two per cent level. This means that for these two instructors, and particularly for the latter, the students choosing them differed from those having them but not choosing them on the basis of their scores on the General Activity scale. Inspection of the data suggested that these instructors, and the students who chose them, tended to score lower on General Activity than did the other students and instructors.

Product-moment correlations between the instructors' selection ratios and their scores on each of the scales were computed. The results are presented on Table 15.

Table 15

Product-moment correlations between instructors' ratios and their scores on Guilford-Zimmerman scales, Home Economics sample

G	R	A	S	E	O	F	T	P	M
.30	-.13	.28	.06	.21	-.74*	.42	.20	.58	.60

* Significant at the five per cent level

This suggests that there was a tendency for the more effective instructors to score lower on the Objectivity scale than did the other instructors. Although there are a number of sizeable correlations in Table 15, only one is significant because of the small number of degrees of freedom. This result might also be due to chance factors.

The ten instructors were divided into two groups: the five with the highest selection ratios and the five with the lowest. For each scale means were computed for the two groups and a t-test was made to determine if these means differed significantly. In Table 16 are presented the means for the high and low groups on each scale, and the t-value for the difference in each case.

Table 16

Comparison of most and least frequently chosen Home Economics instructors on Guilford-Zimmerman scales

G-Z scale	Upper group mean	Lower group mean	t
G	19.00	14.00	1.47
R	21.80	21.80	0.00
A	12.20	11.80	0.18
S	16.40	17.60	0.30
E	22.40	22.20	0.49
O	18.60	22.00	2.36
F	20.80	17.40	1.22
T	19.30	20.20	0.23
P	19.40	24.60	2.23
M	13.20	11.00	0.81

None significant at the five per cent level

None of the differences in Table 16 are significant at the five per cent level. This lack of significance is caused to some extent by the small size of the sample, resulting in a small number of degrees of freedom.

In Table 17 are compared the variances of the instructors and the students on each of the scales.

Table 17

F-ratios of variance of Home Economics students and instructors on Guilford-Zimmerman scales

G	R	A	S	E	O	F	T	P	M
1.01	1.08	2.62	1.05	2.28	3.54*	1.15	3.38*	1.42	1.04

* Significant at the 10 per cent level

This indicates that there was a slight tendency for the instructors to be more homogeneous than the students on the Objectivity and Thoughtfulness scales.

A comparison was made of the number of scales on which an instructor and the students choosing her were similar by the procedure previously described. In this case, there were no consistent results. The two instructors with the greatest number of scales in common with their students (six and five) ranked fifth and sixth respectively in selection ratio. The instructor with the highest selection ratio had only two scales in common with the students who chose her. The number of times in which a scale was found to have high similarity between students and their instructors varied from six (for Thoughtfulness) down to one.

Biographical information. The Home Economics instructors were divided into two groups based on their selection ratios: the six with the highest ratios were compared with the four with lowest ratios. The procedure of analysis was the same as that for Mechanical Engineering and Animal Husbandry.

For only four of the 100 items were significant differences found between the high and low groups at the five per cent level. According to these items, the more effective teachers tended to have had fathers who were better educated than the other group, they read more books per year, felt that their grades in college were not what they could have been, but were less concerned about mistakes on exams while in college. These results may be due simply to chance, since finding four items out of 100 to be significant at the five per dent level is to be expected due to chance factors.

The second part of the biographical analysis involved combining the instructors who gave the same response to an item and comparing the responses to that item of the students who chose them with the responses of the other students. In only two cases were significant differences found at the five per cent level. Two instructors had indicated that their grades were higher in relation to their expectations while in college than was the case for the other instructors; but the students who chose these two instructors said that their own grades in college are the same or poorer than they expected. Two of the instructors indicated that they have no favorite television programs because they seldom watch television; but the students who chose them named cultural programs as their favorites. The failure of these results to make sense, coupled with a finding of only two significant differences out of 100 items, strongly suggests that the results are due to chance factors.

Descriptive material. The rank orders of the three classifications was much the same as for Mechanical Engineering and Animal Husbandry; "teaching methods" was generally mentioned most frequently, "treatment of students" next, and "personal characteristics" last. However, there was some tendency for the female students to note "treatment of students" as relatively more important and "teaching methods" relatively less important than had the male students. For one of the more popular instructors, "treatment of students" was mentioned more frequently than the other two categories; in no case was this true for the male instructors. "Personal characteristics" also tended to be mentioned more frequently by the Home Economics students than by the males. In Table 18 is presented a comparison of the percentages of statements made in each category by students in each of the three areas.

Table 18

Comparison of percentages of statements regarding most effective teachers related to major categories

Category	Mech. Eng.	Anim. Husb.	Home Ec.
Teaching methods	69	57	48
Treatment of students	23	28	35
Personal characteristics	8	15	17

A comparison was also made between the total number of statements made by students in a department and the number of students themselves. The 70 Mechanical Engineering students made 297 descriptive statements of their instructors, an average of 4.24 per student. The 56 Animal

DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE
Office of Education
Cooperative Research Branch

Project Description

Student-Teacher Interaction as a Determiner of Effective Teaching.

Problem.--This study will investigate the relationship between the personality interaction of students and teachers and the effects of this interaction on teaching effectiveness.

Major objectives.--The objectives are (1) to determine whether or not personality interaction between a student and his teacher influences the degree to which that particular teacher is effective with that particular student; and (2) if personality interaction is a determiner of teaching effectiveness, to reveal along what personality dimensions the interaction occurs.

Procedure and design.--Two hundred male junior and senior college students in two relatively large departments of Iowa State University and their teachers in these departments will constitute the sample for this study. Students and teachers will be given a temperament survey and a life-history questionnaire, and each student will be asked to indicate preferences for teachers within his major department and this information will be related to the number of contact hours between particular teachers and each student. In the first step of the analysis the results of the inventories obtained from the teachers will be used to locate general differences between those who were nominated frequently as outstanding teachers and those who were nominated infrequently. In the second step the analysis will determine the student characteristics which are related to their nominations of effective teachers. The overall purpose of the analysis is to determine whether or not the degree of similarity between student and teacher personalities is a factor in the student's choice of an effective teacher.

#763

Edwin C. Lewis, assistant professor,
department of psychology, Iowa
State University, Ames, Iowa

Project No. 763
Duration: 10 months
September 1959 to June 1960

Husbandry students made 220 statements, an average of 3.93 per student. The 43 Home Economics students made 195 statements, an average of 4.53 per student.

Combined groups

An analysis was made of the results obtained by combining the Mechanical Engineering and the Animal Husbandry data, which might have increased the power of the significance tests by increasing the size of the sample.

The Guilford-Zimmerman scores for the two instructors from each department with highest selection ratios were compared in a search for possible differences between departments or between scales. The F-value for the variance between departments was .07. The F-value for the variance among Guilford-Zimmerman scales was .08. The F-value for the mean square interaction was .20. None of these approaches significance at the five per cent level. This indicates that the Guilford-Zimmerman did not differentiate between the most effective teachers in these two departments nor were extreme scores on any of the scales especially characteristic of the most effective teachers.

The high-ratio instructors from the two departments were combined (N = 12), as were the low-ratio instructors (N = 13). A test was made on each biographical item to determine whether these two groups differed significantly. Only four such differences were found, which is attributable to chance at the five per cent level. According to these doubtful results, the more effective instructors tended to (a) have come from larger communities, (b) have had fewer siblings, (c) have changed schools more frequently as a child, (d) have found schoolwork to be quite easy.

Although in most cases the biographical items which were found to differentiate significantly between groups are of doubtful validity since the results might have been due to chance, it appeared possible that some of these items might have had greater validity than this by virtue of being found to be significant in more than one group. However, inspection of the data shows that this is not the case. The six items which differentiated between the high and low instructors in Mechanical Engineering are different from the one which differentiated in Animal Husbandry and the four which differentiated in Home Economics. Likewise, the three items which differentiated among groups of students who selected various instructors in Mechanical Engineering are different from the one item which differentiated among such groups in Animal Husbandry and the two items which differentiated among such groups in Home Economics.

DISCUSSION AND CONCLUSIONS

The results of this study may be summarized as follows:

1. The instance in which a Guilford-Zimmerman scale most significantly differentiated among students grouped according to instructor choice was the Masculinity scale applied to the Animal Husbandry sample. The F-test for this scale was significant at the one per cent level, and the t-tests were significant for two instructors. For the Mechanical Engineering sample, the Restraint scale was significant at the five per cent level, but none of the t-tests on this scale were significant. For the Home Economics sample, the General Activity scale was significant at the five per cent level and two of the t-tests were significant. This suggests that students do tend to interact with instructors along certain personality dimensions for effective learning, but that such dimensions are difficult to locate and are probably specific to the particular group involved.

2. There was some evidence of the existence of relationships between selection ratio (the criterion of effectiveness) and personality dimensions, but the results were not consistent. For the Mechanical Engineering sample, the Emotional Stability scale differentiated along this line as evidenced both by correlations and by t-tests. The Sociability scale was significant only as evidenced by correlation and the Friendliness scale was significant only as evidenced by the t-test. On all three scales, the more effective instructors scored lower than

the less effective. No significant differences other than those to be expected by chance were found for Animal Husbandry or Home Economics.

3. Significant differences between the variances of the students and instructors were found on two Guilford-Zimmerman scales for Mechanical Engineering, three scales for Animal Husbandry, and two scales for Home Economics. In only two of these seven cases were the students found to be more homogeneous than the instructors. One of these was found in Mechanical Engineering and the other in Animal Husbandry.

4. There was generally no strong tendency for the instructors and the students who selected them to have similar scores on the Guilford-Zimmerman scales. The exception was in Mechanical Engineering; in which the two instructors selected with outstanding frequency also had more scales in common with their students than did the other instructors.

5. The biographical data gave uniformly negative results. In all cases, the number of items found to differentiate significantly between the groups under consideration were no more than would be expected by chance. There was some slight indication, particularly in the Mechanical Engineering and Home Economics samples, that the more effective instructors tended to have a more intellectual background and interests, but this must be highly qualified. There was no evidence of student-teacher interaction on any of these items which could be attributed to a true interaction.

6. In describing their reasons for their selections of a teacher as most effective, the students mentioned characteristics involving

teaching methods most frequently, treatment of students second, and personal characteristics last. The Home Economics students tended to put relatively more emphasis on "treatment of students" than did the male groups.

The general lack of significant results in this study must be noted as the major finding. Although some significant differences were found, they could in many cases be attributed to the operation of chance factors. It is true that the relatively small size of the samples required that the differences be quite large in order to be significant; it is therefore possible that a replication of this study on a much larger group might yield more meaningful results. However, there are few situations in which considerably larger groups could be obtained. It is likely that the sample size and the method used in this study could not be drastically improved elsewhere. The problem of sample size is one which is often present in a study such as this of complex psychological variables.

It is also evident that the significant results which were found—e.g., the significant differences on certain Guilford-Zimmerman scales—were specific to the departments involved and that no general differences along these lines were located. This suggests that if such personality interaction as was originally hypothesized does take place—and these results provide some tentative evidence that it does—it is along different lines in different settings and no generalizations are possible from the data presented here.

Since the results are inconclusive, the question as to the validity of the criterion might be raised. It is unfortunate that there is no generally accepted criterion of teacher excellence for research of this type. The criterion of student evaluation was chosen because it was easily managed and because the focus of the study was on the student's perceptions of his various teachers in terms of effectiveness. The descriptive statements which the students made of the instructors which they selected indicated that their choices had apparently been based on mature and careful thought. It is possible that another criterion might have produced more conclusive results, but there is no evidence to support this contention.

Should other measuring instruments have been used? This is also a reasonable suggestion, but there is no evidence that any others would have been better. A few significant results were obtained with the Guilford-Zimmerman and these might well be investigated further. Leeds (1956) has found certain Guilford-Zimmerman scales to be related to scores on the MTAI.

The usefulness of the biographical inventory is more questionable. It was not helpful in this study, since in the instances in which significant differences were found they were no more frequent than would have been expected by chance. In addition, these differences did not "make sense," further evidence that they were probably due to chance factors. Perhaps further work needs to be done in refining and organizing biographical inventories of various kinds before they should be applied to research studies such as this. There was apparently a considerable amount of "dead wood" in this inventory for the purposes of this study.

Any conclusions to be drawn from these results must of necessity be tentative and limited. Neither of the two major questions investigated have been answered completely. On the one hand, there is some evidence that personality interaction did contribute to the students' choices of instructors as most effective, but the evidence to support this is not overwhelming and much is still to be learned about how this operates. Any such interaction is apparently specific to the department involved; the dimensions along which this operates probably vary from one department to another.

Few consistent differences were found between the teachers chosen frequently and those chosen infrequently, even when amount of student contact with them was controlled. This seems to support the findings of several other investigators that differences between good and poor teachers are not easily isolated and that the distinction is not as great as has been assumed.

These results also support the contention that the investigation of student-teacher relationships, and the effectiveness of teachers, is a highly complex problem which requires new and different approaches. This study has attempted one such approach. Although the results are far from conclusive, they suggest that this approach does have some merit.

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APPENDIX A

Letter sent to students requesting their cooperation in the project.

Dear Sir:

The Department of Psychology is conducting a study to learn more about teaching effectiveness. The [Department of Animal Husbandry] has agreed to cooperate in this study and your name was given to us as an [A, H. Junior or Senior] who might be able to supply us with some of the information we need.

We will ask you to select from [Animal Husbandry] teachers the teacher who, in your judgment, teaches best, and to provide us with some information about yourself which will help us in analyzing this selection.

You have been chosen because you are an upperclassman and have had, therefore, the most contact with instructors in your department. In addition, you are probably in the best position to make a mature judgment concerning their effectiveness. Your judgments will be kept confidential.

Please stop in at the Student Counseling Service (Room 101, Building H) at your earliest convenience to make this judgment and to respond to two questionnaires. It will take about an hour of your time, although you may take as long as you like. You may complete it in two sessions if you prefer. We have sufficient funds to pay you $1.50 for your help. The Counseling Service is open between 8 and 5, Monday through Friday.

If you have no free time to contribute to this project during the times at which the counseling service is open, please let us know and we will try to make other arrangements. You may contact me at Extension 233 at the University. We need the cooperation of all [A. H. Juniors and Seniors] in order to make this project a success.

Yours truly,

Edwin C. Lewis, Ph.D.
Department of Psychology

APPENDIX B

BIOGRAPHICAL INVENTORY

The purpose of this inventory is to obtain information concerning (1) your past experiences, (2) your present behavior, and (3) your attitudes toward various educational problems. It is designed to be given both to individuals now in college and to people who have graduated from college. This will explain the way in which some of the questions are worded. Please answer each question as it applies to you, in terms of your present academic status.

Each of the questions requires only one response. Please do not mark more than one. If none of the responses exactly expresses your answer, please mark the one which comes the closest. Do not leave any unanswered. If you feel that your response requires qualification, you may write an explanation on the back of the answer sheet along with the number of the question. Do not mark in the booklet.

Be sure your name, age, college department, and current status in school (undergraduate student or instructor) are on the answer sheet.

1. In what section of the country were you born?

   (A) middle west
   (B) northeast
   (C) southeast
   (D) northwest
   (E) southwest

2. What was the size of the community in which you spent the greatest amount of time as a child (age 6-16)?

   (A) rural
   (B) under 1000
   (C) 1000-10,000
   (D) 10,000-100,000
   (E) more than 100,000

3. How many brothers and sisters do you have?

   (A) none
   (B) one
   (C) two or three
   (D) four or five
   (E) six or more

4. What is your position among your brothers and sisters?

   (A) only child
   (B) oldest
   (C) youngest
   (D) none of the above

5. In how many different houses has your family lived since you were born?

   (A) one
   (B) two
   (C) three-five
   (D) more than five

6. Throughout your public school education, how many times did you change schools, outside of the normal changes from grade school to junior high to high school?

   (A) none
   (B) one
   (C) 2 or 3
   (D) four or more

7. Did your parents live together all of the time you were growing up?

   (A) Yes
   (B) No, because one died.
   (C) No, because both died.
   (D) No, because they were separated or divorced.
   (E) No, because one was away from home for a considerable period of time.

8. When you were a child, did your parents talk and act as though money were a problem?

   (A) yes, frequently
   (B) yes, occasionally
   (C) very seldom

9. When you were a child, how important was religion in your home?

   (A) extremely important
   (B) moderately important
   (C) relatively unimportant

10. How much education did your father have?

    (A) college graduate
    (B) some college, but didn't finish
    (C) technical or business school
    (D) high school graduate
    (E) less than 12 years